NASA's Project Management Competencies: A Composite View

Preliminary Draft
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*The Competencies

Competency Area 1: **Project Conceptualization**	Competency Area 6: **NASA Environment**
1.1. Project Proposal	6.1. Agency Structure and Internal Goals
1.2. Requirement Development **	6.2. NASA PM Procedures and Guidelines
1.3. Acquisition Management	6.3. International Standards and Political Implications**
1.4. Project Planning **	
1.5. Cost-estimating ++	
1.6. Risk Management **	
Competency Area 2: **Resource Management**	Competency Area 7: **Human Capital Management**
2.1. IT and MIS ---	7.1. Position Management ---
2.2. Budget and Full Cost Management **	7.2. Recruitment, Hiring and Retention **
2.3. Capital Management ---	7.3. Team Dynamics and Management **
Competency Area 3: **Project implementation**	Competency Area 8: **Safety and Mission Assurance**
3.1. Systems Engineering**	8.1. Environment and Ecology ---
3.2. Design and Development**	8.2. Workplace Safety
3.3. Contract Management **	8.3. Mission Assurance **
	8.4. Security
Competency Area 4: **Delivery, Operation, and Closeout**	Competency Area 9: **Professional and Leadership Development**
4.1. Logistics Management ---	9.1. Mentoring and Coaching
4.2. Stakeholder Management	9.2. Communication/Decision Making **
4.3. Technology Transfer and Communication	9.3. Leadership**
Proposed: Transition to Use, Project Delivery and Operations	9.4. Ethics ---
Competency Area 5: **Program Control and Evaluation**	Competency Area 10: **Knowledge Management**
5.1. Tracking/Trending of Project performance	10.1. Knowledge Capture and Transfer
5.2. Project Control **	10.2. Knowledge Sharing
5.3. Project Review and Evaluation	

*****Compiled via aligning APPL's PMDP Competency Model, Center PM Competency Models (MSFC, ARC, JSC, JPL,) NPR 7120.5C) PM Requirements (Generic Projects), PM-PIMBOK and DACUM Tasks

**** High Congruence:** similarly represented in at least 6 of 8 sources
++ High Congruence: listed in 5 sources; added to the list
---Low Congruence: listed by 2 or fewer resources and/or not detailed.

1.1 Project Proposal: *Conceptualizing, analyzing, and defining program/project plans and requirements and using technical expertise to write, manage, and submit winning proposals. Also involves developing functional, physical, and operational architectures including life cycle costing.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Be aware of** industry partnering activity and NASA infrastructure utilization and developing functional, physical, and operational architectures, including life cycle costing. **Able to** describe, identify or define: • How NASA projects are proposed, approved and funded. • The basic elements of a successful project proposal. • The steps involved in getting a project approved and funded. • How a current project's proposal meets the needs of a NASA Strategic Plan element and the Center's Implementation Plan. **And to** ***Be involved in*** developing, costing, and trading concepts, along with their technology plans. ***Support*** activities involving multiple organizations outside the Center, developing a network of external contacts. ***Contribute*** expertise to proposal writing and/or submission processes.	**Able to** describe, identify or define: • The Center Bid and Proposal process and how it applies to the way that NASA projects are proposed, approved, and funded. • How to manage technical contributions to a bid and proposal effort. **And to** ***Participate in:*** • Developing functional, physical, and operational architectures, including life cycle costing. • Development, trading, and selecting concepts, along with their technology plans. • Activities involving multiple organizations outside the Center, expanding network of external contacts. • Industry partnering activity and NASA infrastructure utilization. • The steps of the Center's Bid and Proposal process, such as submitting a project for consideration. **Contribute to**/lead effort for managing a proposal writing/submission process. **Develop capability** in key aspects related to developing, costing and trading concepts, along with their technology plans.	**Able to** describe, identify or define: • How the Center Bid and Proposal process interfaces with the NASA process for responding to Announcements of Opportunity (AO) and NASA Research Announcements (NRA). • Center and Agency resources supporting Bid and Proposal activities. **And to** ***Demonstrate:*** • Expertise in writing, managing and submitting winning proposal(s). • Capability in developing functional, physical, and operational architectures, including life cycle costing. • Capability in development, trading, and selecting concepts along with their technology plans. ***Effectively use*** Bid and Proposal support resources to lead the development of complete bid and proposal packages. ***Support*** industry partnering activity and NASA infrastructure utilization. Significant participant in activities involving multiple organizations inside and outside the Center, enabled by network of external contacts.	**Able to** describe, identify or define: • NASA process for programs and projects to respond to Announcements of Opportunity (AO) and NASA Research Announcements (NRA) for achieving specified NASA mission goals and objectives. • The strategic implications (technical emphasis, management structure, partnerships, costing) of bid and proposals and how to successfully address them in winning proposals. **And to** ***Review*** and ***approve*** bid and proposal packages. ***Direct*** development of functional, physical, and operational architectures, including life cycle costing and trading concepts along with their technology plans. ***Identify*** industry partnering opportunities and NASA infrastructure utilization. ***Partner*** in development of appropriate domestic and international partnerships.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

1.2. Requirement Development: *Developing project requirements using functional analysis, decomposition, and allocation; finalizing requirements into the baseline; and managing requirements so that changes are minimal. Defining, developing, verifying, reviewing and managing changes to program requirements.*				
Role	**Project Team Member**	**Subsystem or Small Project Manager**	**Major System or Large Project Manager**	**Program or Very Large Project Manager**
Proficiency Level Description	**Understand** the process of defining requirements, concepts, project plans, and associated items. **Understand** the process of development and iteration of technical requirements, including stakeholder acceptance. This includes analyzing and challenging impacts, capturing relevant standards and criteria, and ensuring each requirement is verifiable. **Able to** describe, identify or define: • The need for customer involvement in order to understand their objectives, plans, and requirements. • The process of decomposing customer requirements into project requirements that are clear, feasible, and verifiable. • Requirements baselining, traceability, change process, and allocation. • Similarities & differences in requirements processes associated with Flight and R&T Tech. Development projects such as Waterfall vs. Spiral models.	**Able to** describe, identify or define: • The relationship of system/sub-system requirements traceability to the project scope and to the project specification. • How to assess the appropriateness of a system/subsystem requirement to a project deliverable. • The process of requirements change control. **And to** ***Participate in*** defining requirements, concepts, project plans (baselining, traceability, change process, allocation) and associated items. ***Select and/or tailor*** appropriate requirements, development and management processes according to project type (e.g. Flight, Research & Technology Development). ***Define, verify, review and maintain*** requirements and specifications through functional analysis, technology feasibility, availability, readiness and decomposition from top-level goals. ***Trace*** an assigned system/subsystem product to a specific requirement in the project specification. ***Participate in*** requirements change control for the subsystem and balance requirements changes with subsystem cost and schedule.	**Able to** describe, identify or define processes: • To obtain and evaluate customer functional and performance project requirements and obtain stakeholder acceptance. • To define, develop, verify, review and maintain specifications. • To select and/or tailor appropriate requirements, development and management processes according to project type (e.g. Flight, Research & Technology Development). **And to** Effectively ***manage*** others in requirements development tasks such as functional analysis, analysis of technology feasibility, availability, readiness and decomposition. ***Select and tailor*** appropriate processes according to project type. ***Approve*** project requirements and changes.	**Able to** describe, identify or define: • Programmatic requirements for obtaining and evaluating customer functional and performance requirements and their management. • The processes for defining, developing, verifying, reviewing and managing changes to program requirements. **And to** ***Manage development and iteration*** of requirements concepts, project plans, POP cycle and associated items for project or large sub-system including stakeholder acceptance. This includes analyzing and challenging impacts, capturing relevant standards and criteria, and ensuring each requirement is verifiable. ***Direct*** requirements base-lining process, traceability, change process, and allocation. ***Approve*** program requirements and changes.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

1.3 Acquisition Management: *Developing, implementing, and monitoring acquisition strategies, procurement processes, contract activities, and approval requirements to support flight hardware/software or other project requirements.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Understand** and fully comply with federal requirements for contracting via Other than Full and Open Competition (e.g., 8(a), small business, veteran-owned). **Be aware of:** the process for the development and implementation of contracts and the procurement of flight hardware/software or other project requirements, specifically--- • Statements of Work (SOW) • Data Requirement Descriptions (DRDs) • Verification plans, technical metrics and acceptance and approval requirements • The attainment process. • Available acquisition instruments and their uses, such as contracts, grants, and cooperative agreements **Able to** describe, identify or define: • The purpose and key elements of an acquisition strategy. • Requirements for acquisitions involving well-known, commonly available products, materials, services. • The general acquisition strategy outline of one's current project(s). • The NASA procurement process of obtaining products and services from outside of NASA. **And to** ***Write*** clear SOW, requirements, and specifications that accurately describe services and products contractors are obligated to provide. ***Prepare*** an accurate purchase order for products or services from outside of NASA.	**Able** to describe, identify or define: • The project's acquisition strategy. • The processes and tools necessary to implement project's acquisition strategy. • Key principles and behaviors of successful negotiating practices. **And to** ***Contribute*** to development, implementation and monitoring acquisition strategies, contract SOW, DRDs, verification plans, and approval requirements to support flight hardware/ software or other project requirements including, developing SOW requirements, DRDs, and data types (data approval requirements). ***Establish*** effective partnerships with Acquisition/ Contact and Resources management personnel. ***Formulate*** and ***execute*** acquisitions consistent with attainment strategies for projects with low to moderate complexity. ***Perform*** project acquisitions for projects with relatively straightforward and stable funding situations. ***Monitor*** and ***evaluate*** the performance of acquisitions with low to moderate complexity. ***Initiate*** and ***track*** procurement processes for needed services and/or products (SOW, PR, etc.). ***Serve on*** Source Evaluation Board (SEB) or as a Contracting Officer's Technical Representative (COTR) and have experience with development and implementation of contracts, procurement of major hardware or software situations. ***Use*** the key elements of successful win-win negotiation practices in the management of vendor/contractor relationships.	**Able** to describe, identify or define: • Strengths, weaknesses, opportunities and risks associated with various acquisition strategies. • NASA and Center acquisition procedures and processes. • Requirements for acquisitions involving, advanced, newly developed and innovative products, materials, and services. **And to** ***Manage*** development of and ***approve*** a project's acquisition strategy. ***Establish*** and ***manage*** successful win-win vendor/contractor relationships. ***Establish*** effective partnerships with Acquisition/Contact and Resources management personnel. ***Demonstrate*** capability in development, implementation and monitoring acquisition strategies, contract SOW, DRDs, verification plans, and approval requirements to support flight hardware/software. ***Apply*** and ***use*** NASA's procurement process and contract relationships. ***Formulate*** and ***execute*** acquisitions consistent with attainment strategies for large-scale, complex projects. ***Manage*** development of contract SOW requirements, contractor DRDs, and data types (data approval requirements).	**Able** to describe, identify or define: • Strengths, weaknesses, opportunities and risks associated with the different acquisition strategies. • Federal Acquisition Regulations (FAR), NASA's procurement process, and contract relationships. **And to** ***Approve*** and ***oversee*** a program's acquisition strategy. ***Lead*** activities associated with development and implementation of contracts, procurement of major hardware or software, serving on a SEB or as a COTR. ***Direct*** development, implementation and monitoring acquisition strategies, contract SOW, DRDs, verification plans, and approval requirements to support flight hardware/ software. ***Perform*** project acquisitions involving multiple contracts, grants, cooperative agreements and other complex funding mechanisms. ***Monitor*** and ***evaluate*** the performance of acquisitions on large-scale, complex projects. ***Protect*** the interests of NASA when acquiring products, materials, and services in situations involving complex negotiations/agreement.
HQ courses				
Center courses				
OJL activities				

1.4 Project Planning: *Developing effective project management plans and technical integration of project elements for small, moderate, and complex projects including scope definition, schedule and resource estimation and allocation for all project phase activities from concept to launch and tracking.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Understand:** • Project/technical integration of project elements, design functions and discipline functions, and their associated interactions to balance performance, cost, reliability, operability, and risk. • Project formulation activities. **Able to** describe, identify or define: • The overall NASA project life cycle, and specific steps in the cycle (e.g. milestone reviews) and project life cycle and gate products. • How to use scheduling and cost estimating tools to plan design, development, and testing activities. • How to develop a work breakdown structure (WBS) and associated schedule. **And to** ***Participate*** in project formulation activities and development of a life cycle project plan including WBS, budget, schedule, staffing, and project success criteria. ***Contribute*** to the development of the project WBS. ***Create*** the schedule including the steps, linkages, and interfaces of an assigned task for a specific work breakdown structure element. ***Estimate*** the resources required for project work element. ***Use*** standard project planning and tracking tools.	**Understand:** • Center and Agency budget processes. • The entire Life Cycle Review Process and is able to plan for milestone reviews. **Able to** describe, identify or define the planning process at the subsystem level including: • Scope definition • Integrating activities into a schedule, • Resources estimation and allocation **And to** ***Manage*** a small project subsystem or equivalent entity during formulation phase, or other significant involvement in project formulation (sole authority for project budget, schedule, and scope). ***Participate*** in project/technical integration of project elements, design functions and discipline functions, and their associated interactions to balance performance, cost, reliability, operability, and risk. ***Develop project plans*** for simple, relatively routine, small to moderate-sized projects. ***Integrate*** plans, schedules, and cost estimates for a subsystem. ***Obtain*** project approvals through well-established means (e.g., in own work unit). ***Assure*** that resources and schedule are commensurate with the project scope. ***Establish*** a comprehensive Work Breakdown Structure for (system/subsystem).	**Able to** describe, identify or define the planning process for a large project subsystem or equivalent entity including: • Scope definition • Integrating activities into schedule, • Resources estimation/allocation • Typical management controls for area of responsibility **And to** ***Manage*** *a* large project subsystem or equivalent entity during formulation phase (sole authority for project budget, schedule, and scope). • Development of (and approve) the overall project plan that includes integrated schedule and resource requirements and allocation. ***Use*** advanced project planning and tracking tools with extensive Earned Value Management (EVM) capabilities. ***Demonstrate*** capability in: • Development of a life cycle project plan including WBS, budget, schedule, staffing, and project success criteria. • Project/ technical integration of project elements, design functions and discipline functions, and their associated interactions to balance performance, cost, schedule, reliability, operability and risk. • Planning for milestone reviews. ***Be*** a project advocate	**Able to** describe, identify or define: NASA program and project planning processes that define the scope, schedule, resource requirements, and risk considerations required of a successful project to meet program objectives. **And to** ***Create project (and resource) plans:*** • For complex projects with many interrelated paths, involving multiple organizational units or contractors, and especially challenging deadlines. • For projects that are novel, complex, or highly interrelated with other work. ***Manage***: • The development of and ***approve*** the overall program plan • A large project, major system, or equivalent entity during formulation phase (sole authority for project budget, schedule, and scope). ***Direct:*** • Technical integration of project elements, design functions and discipline functions, and their associated interactions to balance performance, cost, schedule, reliability, and operability. • Development of a life cycle project plan including WBS, budget, schedule, staffing, and project success criteria. ***Obtain*** approval for especially innovative or complex projects that involve multiple funding sources and work interrelationships with other units.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

1.5 Cost Estimating: *Developing credible cost estimates to support a variety of systems engineering trade studies, affordability analyses, strategic planning, capital investment decision-making, and budget preparation during project planning. Also, providing information for independent assessments as required.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Understand**: basic cost estimating processes.	**Able to *Ensure:*** • Use of straightforward and well-documented models and techniques for cost estimating during relevant project life cycle phases. • That all project needs are adequately covered and properly time phased in the budget submission for projects of low to medium complexity. • That the cost estimate covers the entire project life cycle.	**Understand** advanced cost estimating processes. **And to** ***Use*** cost estimates as a planning tool and as an additional input or constraint into the design space for the project. ***Ensure*** use of advanced models and techniques for cost estimating during relevant project life cycle phases. **Assure** that a cost analysis requirements description (CARD) is developed and maintained.	**Able to** evaluate and reconcile independent cost estimates with advocacy cost estimates. **And to** ***Ensure*** that all project needs are adequately covered and properly time phased in the budget submission for large-scale complex projects and/or projects with resource issues.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

1.6 Risk Management: *Identifying and analyzing risk and its impact; developing and implementing strategies for risk mitigation; tracking risk, and implementing continuous risk management plans. Also involves communicating risk information to all project/program levels.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • The fundamental concept of continuous risk management (CRM). • The NASA process of continuous risk management (CRM). • The connection between identified risk mitigation strategies and the project's plan and schedule. • Risk management process • Techniques to assess, mitigate, and balance risks • Project management tools and their capabilities with respect to risk management. • Utilization of risk analysis to support decision-making. **And to** ***Participate in***: • Identifying risks of a project subsystem or element. • Risk management planning and control with respect to technical cost. ***Identify*** and ***evaluate*** obvious or easy-to-detect technical, schedule, cost and programmatic risks.	**Able to** describe, identify or define: • The application of risk management in a system/subsystem and its role in a project risk management plan. • Purpose and value of risk identification tools such as Failure Modes and Effects Analysis, Fault Tree Analysis, Probabilistic Risk Assessment, etc **Able to:** • Develop and implement strategies to mitigate or eliminate risk. • Evaluate risk management products and understand their implications to the system of interest. • Use techniques to assess, mitigate, and balance risks. **And to** ***Create*** and ***implement*** a risk management/ mitigation plan for a subsystem. Involves using failure modes and effects analysis, fault tree analysis, probabilistic risk assessment, or other suitable risk analysis techniques as appropriate. ***Participate in*** a risk management process and use risk analysis to support decision-making. ***Avoid*** working on risk issues in isolation; uses entire project team, stakeholders, and outside resources as necessary in anticipating and responding to risk issues. ***Manage*** and ***communicate*** risk data • To all potential stakeholders. • Via an integrated system (e.g. IRMA).	**Able to** describe, identify or define: • The application of risk management to project management. • How to prepare and maintain a project risk management plan using risk management metrics, indicators, and criteria to identify and manage risk. **And to** ***Participate*** in risk management planning and control with respect to technical, cost and schedule performance. ***Manage*** the development of and ***approve*** the project risk management plan. ***Implement*** a continuous risk management plan that supports informed, timely, and effective decisions to control and mitigate risk throughout the project life cycle. ***Lead*** a risk management process and utilization of risk analysis to support decision-making. ***Lead*** a risk analysis meeting in which a collection of risks are evaluated for impact, probability, and timeframe; classified/ categorized into risk areas for applying mitigation strategies collectively; and prioritized to identify the risks most important to the project. ***Anticipate*** difficult-to-detect technical, schedule, cost, and programmatic risks and then adjusts plans to overcome them.	**Able to** describe, identify or define: • How continuous risk management process and its application through a risk management plan reduces program and project risk. **And to** ***Approve*** the risk management plan for a program. ***Implement*** continuous risk management in a program and its projects to reduce risk. ***Lead*** development and execution of Continuous Risk Management planning. ***Direct*** project risk management and control with respect to technical, cost and schedule performance. ***Direct*** a risk management process and utilization of risk analysis to support decision-making. ***Monitor*** the risk management processes and is able to make adjustments and improvements to ensure effectiveness.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

2.1 IT and MIS:

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description				
HQ courses				
Center courses				
OJL activities				
Other learning activities				

2.2 Budget and Full Cost Management: *Executing NASA and Center budgeting processes for annual (POP) and life cycle budget projections ensuring consistency between resource availability and project resource needs, including staffing, facilities, equipment, and budget.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Understand:** • The project budget development process. • NASA's budgeting process and accounting and financial management techniques. **Able to** describe, identify or define: • Processes for cost estimating technical work products. • General principles of full cost and Earned Value Management (EVM) and their application in the project environment. • Identify significant resource needs and issues for the system of interest. **And to** ***Perform*** cost estimating on technical work products. ***Contribute:*** • To developing and iterating Program Operating Plans. • Timely and accurate full cost budget information (such as labor, procurement, travel estimates) to project managers when requested. • Recording of project budget activities in NASA's accounting and financial systems. ***Use*** Work Breakdown Structure as a tool for tracking actual vs. estimated costs and uses this information to revise cost models appropriately.	**Able to** describe, identify or define Center processes and tools for budget preparation and full cost management and their application in the project environment. **And to** ***Review*** and ***approve*** cost estimates for subsystem elements. ***Successfully advocate*** to project management the resources needed to accomplish subsystem work scope. ***Contribute:*** • Timely and accurate data (such as budget estimates) to project managers per the POP cycle. • To the project budget development process. ***Evaluate*** resource management products and understand their implications for the system of interest. ***Prepare*** a project operating plan (POP) that projects the cost required to proceed according to the Project Management Plan (PMP). ***Make trade offs*** between multiple and competing needs and issues both internal and external. ***Negotiate*** budgets and contracts with line organizations or contractors. ***Understand*** the process and administer contracts.	**Able to** describe, identify or define: • The NASA budgeting process, Center requirements, and timelines for budget submissions. • Full cost accounting principles and Center tools for full cost management. ***Apply*** NASA's budgeting process and accounting and financial management techniques and systems to project activities. ***Lead*** budget development and iteration with the POP for a subsystem, small project, or equivalent entity. ***Evaluate*** the effectiveness of others in performing cost estimating and full cost accounting. ***Use*** data and information from full cost accounting systems to make decisions regarding resource allocations. ***Successfully advocate*** to program management the resources needed to accomplish project work scope. ***Contribute*** timely and accurate data and analysis to program and Center managers per the POP cycle. ***Manage*** budgets and contracts with line organizations or contractors.	**Able to** describe, identify or define processes and techniques for working with stakeholders to effectively deal with a dynamic budget environment. **And to** ***Make trade offs*** between multiple and competing needs and issues both internal and external. ***Manage:*** • Budgets and contracts with Line Organizations or contractors • The application of NASA's budgeting process and accounting and financial management techniques • The development and iterating of Program Operating Plans. • Budget development and iteration with the POP for a large project. • And ensure accuracy of budget activities in NASA's accounting and financial systems for a large project. **Use** data and information from full cost accounting systems to make resource allocations throughout the program. ***Successfully advocate*** to HQ and Center management for resources. ***Contribute*** timely and accurate data to HQ and Center management per the POP cycle.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

2.3 Capital Management: *Allocating, tracking, and managing funding and other capital resources within a project element, project or program.*				
Role	**Project Team Member**	**Subsystem or Small Project Manager**	**Major System or Large Project Manager**	**Program or Very Large Project Manager**
Proficiency Level Description	**Understand** the processes for allocating, tracking and managing funding and other capital resources within a project.	**Be familiar with processes to** allocate, track, and manage funding and other capital resources within a project element.	**Able to** apply the processes of allocating, tracking, and managing funding and other capital resources within a project.	**Manage** the allocation and tracking of funding and other capital resources within a project.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

3.1 **Systems Engineering:** *Integrating technical processes to define, develop, produce, and operate the project's systems in the most technically robust and cost-effective way possible.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Understand**: • Project/technical integration of project elements, design functions, discipline functions, and associated interactions to balance performance, cost, schedule, reliability, and operability. • SP 6105 including requirements and verification management, configuration and data management, etc. • Systems Engineering NPR under development. • The structured system analysis process for evaluating alternative solutions against established criteria to determine a recommended solution. **Able to** describe, identify or define the processes to: • Identify, allocate, track and control significant technical system attributes. • Identify and quantify system requirements. • Create alternative design concepts. • Select and implement the best design. • Verify that the design is properly built, integrated, and meets the intended purpose. • Integrate distinct and separable elements to form a final system. • Integrate the system of interest with its external interfaces. **And to** ***Translate*** project requirements into design alternatives and then selects the best design option. ***Define*** interfaces among subsystems and how to develop and maintain an interface control. ***Develop*** and ***execute*** test plans to verify and validate that subsystem performance meets requirements.	**Able to** describe, identify or define: • Processes for managing the system engineering process for groups of subsystems yielding properly built and integrated systems. • Methods for assessing how well the systems meet the requirements. • Experience in project/technical integration of project elements, design functions, discipline functions, and associated inter-actions to balance performance, cost, schedule, reliability, and operability. **Able to:** • Balance and trade technical attributes against cost and schedule attributes. • Manage the system analysis and trade study processes. **And to** ***Apply*** SP 6105 including requirements and verification management, configuration and data management, etc. ***Define*** appropriate system engineering processes for others to comply with in developing systems. **Directs** and **evaluate** the system design and testing of others in the successful delivery of more than one complex product.	**Possesses:** • Significant experience in project/technical integration to balance performance, cost, schedule, reliability, operability and risk. • Leadership in structuring activity to conform to SP 6105 including requirements and verification management, configuration and data management, etc. • Leadership in project/technical integration of project elements, design functions, discipline functions, and associated inter-actions to balance performance, cost, schedule, reliability, and operability. **Able to** describe, identify or define resources required for, and methodologies of, systems engineering across the project. **And to** ***Effectively manage*** the system engineering process project-wide. ***Demonstrate*** ability to define appropriate system engineering processes across the project. ***Determine*** required systems engineering resources and manages those resources within project constraints.	**Able** to describe, identify or define significance of systems engineering across multiple projects within a program. **And to** ***Demonstrate*** ability to evaluate, provide, and manage system engineering resources across multiple projects. ***Manage*** project/technical integration to balance performance, cost, schedule, reliability, operability, and risk. ***Direct*** conformance activities related to SP 6105, including requirements and verification management, configuration and data management, etc.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

3.2 Design and Development: *Developing subsystems to meet implementation requirements and producing, integrating, verifying, and testing the sub-system/ system to achieve product quality requirements and optimal technical performance.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • Processes to create the technical design outputs (such as analysis, drawings, specifications and software) to meet product requirements. • Processes to develop, integrate, verify and test the products to demonstrate compliance with requirements. • The project implementation process including requirements management, design, manufacturing, assembly, verification, and acceptance. • The role of independent and peer reviews in establishing quality products. **Able to** transform requirements into qualitative and quantitative solutions for systems of low to moderate complexity. **And to** ***Apply*** specific design engineering practices (such as electrical, mechanical, thermal and software) in the successful delivery of at least one project WBS element. ***Effectively present*** and ***defend*** product designs at major project design reviews such as PDR, CDR ***Support*** systems development to meet implementation requirements. ***Perform*** trade studies when requirements are well understood and the available hardware and software for the system of interest are known.	***Experience in*** developing subsystems to meet implementation requirements. **Able to** describe, identify or define: • Overseeing other's implementation of engineering practices to create technical design outputs (analysis, drawings, specifications and software). • Processes for integrating, verifying, and testing subsystem level products. • The role of independent and peer reviews in establishing quality products and appropriate reviews. • Appropriate design principles, practices, standards and codes for others to comply with when developing products. **And to** ***Direct*** and ***evaluate*** the product design and development of others in the successful delivery of more than one complex product. ***Assure*** reviews are conducted and that review results are incorporated in the designs. ***Manage*** a small project subsystem or equivalent entity during implementation phase including requirements management, design, manufacturing, assembly, verification, and acceptance. ***Evaluate*** alternative solutions against established criteria to determine a recommended solution addressing an issue for systems of low to moderate complexity.	***Significant experience*** in developing systems to meet implementation requirements. **Able to** describe, identify or define: • Processes for evaluating and allocating resources for design and development. • Testing and acceptance processes. • Processes for establishing independent and peer reviews. **Able to**: • Perform and manage multiple trade studies to develop recommended solutions for a complex requirements set. • Transform requirements into qualitative and quantitative solutions for large-scale, complex systems. **And to** ***Evaluate***: • Alternative solutions against established criteria to determine a recommended solution for large-scale, complex systems. • Development and testing activities for adequacy to assure requirements are met. • Review performance and other quality checks on product designs. • And allocate resources to design activities across entire project. ***Manage:*** • System Engineering and Project Teams • A small project, subsystem or equivalent entity during implementation phase, including requirements management, design, manufacturing, assembly, verification, and acceptance, with full authority for both programmatic and technical decisions.	**Able to** describe, identify or define processes used to evaluate adequacy of design and development resource allocation across the projects to achieve overall program objectives. **And to** ***Evaluate:*** • Alternative solutions against established criteria to determine a recommended solution for large-scale, complex systems. • Allocates and manages design and development resources across the program. ***Manage:*** • Projects during implementation phase, and oversee ongoing integrated project planning. • The development of systems that meet requirements. • A major system or large project, or equivalent entity during implementation phase, including requirements management, design, manufacturing, assembly, verification, and acceptance, with full authority for both programmatic and technical decisions.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

3.3 Contract Management: *Performing acquisition management and monitoring contractor activities to ensure hardware/software components are delivered on time, at projected costs, and meet all performance requirements. Also involves performing variance reporting and change control functions.*				
Role	**Project Team Member**	**Subsystem or Small Project Manager**	**Major System or Large Project Manager**	**Program or Very Large Project Manager**
Proficiency Level Description	**Be Aware of**: penetration/insight required for contractor activities. **Understand:** • Configuration or change control process. • Contract performance, variance reporting, and contract award recommendation. **Able to** describe, identify or define the importance of contract surveillance and the different methods that can be employed. **And to** ***Demonstrate*** implementation of contract surveillance activities such as attending progress reviews and reviewing submittals.	**Supported** development of penetration/insight required for contractor activities based upon risk assessment. **Experienced** with contract change control, contract performance, variance reporting, and contract award recommendation. **Able to** describe, identify or define the wide array of contract management activities including surveillance, negotiated change orders, and contract close out. **And to** ***Collaborate*** with project management and Procurement on contract management planning. ***Perform*** contract surveillance activities including knowledge of contractor and monitoring contractors work products. ***Evaluate and*** make recommendations to project management on contract change orders.	**Experienced** in developing penetration/ insight required for contractor activities based upon risk assessment. **Understand** how to manage others in the development of surveillance approaches, negotiate contract provisions, and control of contract changes. **Able to** describe, identify or define the wide array of contract management activities including the acquisition approach and how to optimally select appropriate methods to assure contract terms are met. **And to** ***Demonstrate*** capability for project contract management including change control, monitoring of contract performance, variance reporting, and contract award recommendation. ***Collaborate*** with Procurement on acquisition strategies and contract management planning. ***Successfully negotiate*** contracts. ***Manage*** contract surveillance activities. ***Evaluate*** contractor progress and approve contract changes.	**Able to** describe, identify or define the wide array of contract management activities and how to optimally select appropriate contract types to enable the development and delivery of project products. **And to** ***Develop*** penetration/insight required for contractor activities based upon risk assessment. ***Chair*** contract change control board for Project. **Manage** contract performance evaluation and award recommendation. ***Direct*** and ***approve*** program and project level acquisition strategies. ***Oversee*** contract management of large contracts.
HQ courses		.		
Center courses				
OJL activities				
Other learning activities				

4.1 Logistics Management:

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description				
HQ courses				
Center courses				
OJL activities				
Other learning activities				

4.2 Stakeholder Management: *Identifying, soliciting, and executing of planning interrelationships with those individuals and organizations that are actively involved in the project, exert influence over the project and its results, or whose interests may be positively or negatively affected as a result of project execution or project completion.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Be aware** of: • Stakeholder involvement and communication. • Implementation requirements management. • Political economic and other factors that influence project goals. • External advocacy needs of project. . **Able to** describe, identify or define: • The definition of a stakeholder. • The stakeholders for the project.	**Able to** describe, identify or define the role of stakeholders in project execution and the need for communication and agreements with them. **And to** ***Perform*** stakeholder communication as appropriate. ***Support*** stakeholder involvement and implementation requirements management. ***Engage in:*** • Assessing impacts of political, economic and other factors on project goals. • External advocacy for an initiative and outreach and education of stakeholders. ***Contribute to:*** • Developing and maintaining stakeholder communication and assessing both internal and external influences on the project. • Stakeholder management planning and communications (i.e. outreach, status reports, and requirements management). • Agreements between the Project and its stakeholders (i.e. deliverables both to and from).	**Experienced** in assessing impacts of political, economic, and other factors on project goals. **Able to** describe, identify or define: • The role of stakeholders in project execution. • Examples of involving stakeholders and managing system requirements. • Experience in assessing impacts of political, economic, and other factors on project goals. • Effective methods to communicate and reach agreements with stakeholders. **And to** ***Engage in*** external advocacy for an initiative and outreach and education of stakeholders. ***Direct*** and/or author stakeholder management planning and communications (i.e. outreach, status reports and requirements management). ***Perform*** stakeholder communication. ***Arrange*** and ***approve*** agreements between the Project and its stakeholders (i.e. deliverables both to and from).	**Experienced** with establishing domestic and international relationships considering impacts of political, economic, and other factors on program goals. **Able to** describe, identify or define: • The role of stakeholders in program execution. • Effective methods to identify communicate with and reach agreements with stakeholders. **And to** ***Direct:*** • Process of ***developing and maintaining*** stakeholder communication throughout the project life cycle. • And i**mplement** external advocacy for an initiative and outreach and education of stakeholders. • And/or ***author*** program stakeholder management planning and communications (i.e. outreach, status reports, and requirements management). ***Arrange*** and ***approve*** agreements between the program and its stakeholders (i.e. deliverables both to and from).
HQ courses				
Center courses				
OJL activities				
Other learning activities				

4.3. Technology Transfer and Communication: *Evaluating the feasibility, development, progression, readiness, cost, risk, and benefits of new technologies so they can be developed and transferred efficiently and effectively to project stakeholders or for possible commercialization.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: Technology readiness levels and how they relate to the system of interest. • NASA's technology transfer and commercialization policies and applications. • Processes for technology assessment. • Technology transfer and commercialization processes. **And to** ***Participate in***: • Project technology assessments. • Technology transfer and/or commercialization activities.	**Able to** describe, identify or define: • Processes for leading and reporting results of technology assessment activities. • Processes of technology development and maturation related to TRL. • NASA's technology transfer and commercialization policies and applications. **And to** **Be able to** formulate technology development strategies to fill technology gaps. ***Understand*** and ***develop*** "fall-back" plans and strategies, using existing technology should the new technology not be available. ***Participate in:*** • Technology development planning for the project. • (Possibly lead) in technology transfer and/or commercialization activities. ***Lead*** and ***report*** results of technology assessment activities for related subsystems. ***Establish*** TRL progression plans for subsystem elements. ***Capitalize on*** potentially valuable commercially available technology.	**Experienced** with NASA's technology transfer and commercialization policies and applications. **Able to** describe, identify or define: • Processes for assessing and developing project technologies. • Processes of technology transfer and commercialization and the role of other Center organizations in those processes (such as Legal and Commercial). **And to** ***Direct*** and/or ***author*** technology assessment, development and transfer project plans. ***Evaluate*** and ***approve*** technology maturation progress and assignment of TRL values. ***Arrange*** and ***direct*** technology transfer and/or commercialization activities. ***Creatively leverage*** partnerships and collaborations to use commercial technologies or develop new technologies to meet Center's technology needs.	***Experienced*** with motivating implementation of NASA's technology transfer and commercialization policies. **Able to** describe, identify or define processes for assessing, developing, and transferring technology. **And to** ***Direct*** and/or ***author*** technology assessment, development, and transfer program plans. ***Participate*** as necessary in technology transfer and commercialization activities.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

5.1 Tracking/Trending of Project Performance: *Monitoring and evaluating performance metrics, project risks, and earned value data to analyze, assess and report program status and technical performance.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • Collaborative Work Commitments (CWCs) and Strategic Planning Agreements (SPAs). • Earned Value Management (EVM) methods in contract management. • Maintenance/monitoring of performance metrics, project risk, and earned value data to determine project health status. • Project reporting and evaluation of technical performance metrics, earned value, and risk management analysis. **And to** ***Support*** the maintenance of a decision log containing rationale for major decisions made during the project life cycle.	**Able to:** ***Support*** EVM methods for contract management. ***Maintain/monitor*** performance metrics, project risk, and earned value data to determine project health status. ***Participate in:*** • Development of element-level CWCs and SPAs. • Project monitoring and formal reviews. ***Contribute to:*** • The maintenance of a decision log, at the element level, containing rationale for major decisions made during the project life cycle. • Project reporting and evaluation of technical performance metrics, earned value, and risk management analysis.	**Experienced in:** • Maintaining a decision log containing rationale for major decisions made during the project life cycle. • Developing CWCs and SPAs. • Assuming a leadership role in project reporting and evaluation of technical performance metrics, earned value, and risk management analysis. **Able to:** ***Lead*** comprehensive maintenance/ monitoring of performance metrics, project risk, and earned value data to determine project health status. ***Apply*** EVM methods to contract management. ***Conduct*** continual project monitoring and formal reviews.	**Able to:** ***Implement*** EVM methods for contract management. ***Conduct*** continual project monitoring and formal reviews. ***Maintain*** a decision log containing rationale for major decisions made during the project life cycle. Developed strategy for CWCs and SPAs. ***Manage:*** • The maintenance/monitoring or performance metrics, project risk, and earned value data to determine project health status. • Project reporting and evaluation of technical performance metrics, earned value, and risk management analysis.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

5.2 Project Control: *Performing technical and programmatic activities to control cost, schedule, and technical content and configuration to assure the project's performance is within approved baseline and to address performance variances.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • The purpose of Project Control. • Process for using tracking and trend data to analyze programmatic and technical performance with associated mitigation efforts to address performance variances. • Configuration or change control processes. • Earned value management principles. • Reserve and margin policies and practices • Scheduling methods such as critical path analysis. • Program Management Council (PMC)/other reporting requirements when project plan cannot be met. **And to** ***Participate*** in applying program control techniques, including EVM, data management, and configuration management. ***Support*** configuration control board activities for design/development changes in work elements. ***Develop*** baseline cost, schedule and earned value (where appropriate) projections for work elements. ***Establish*** and ***manage configurations*** for relatively straightforward products (e.g., small number of uses and users, simple documentation and data control requirements, simple user training requirements).	**Experienced** with: • Applying program control techniques, including EVM, data management, and configuration management. • Contract change control. • Applying tracking and trend data to analyze programmatic and technical performance with associated mitigation efforts to address performance variances. **Able to** describe, identify or define: • Responsibilities of configuration control boards (CCB). • Application of cost reporting and earned value principles for multiple project elements. • Schedule integration of multiple project elements. • The processes required to implement corrective actions in areas that deviate from baseline. **And to** ***Contribute*** to project control planning. ***Support:*** • Reserve and margin assessment activity. • CCB activities for design/development changes in subsystem elements. ***Be involved*** with PMC/other reporting when project plan cannot be met. ***Collect. roll up***, and ***report*** on applicable cost, schedule, and earned value control metrics. ***Implement*** the corrective actions for their tasks as directed by the Project Manager.	**Experienced in** developing penetration/insight required for contractor activities based upon risk assessment. **Able to** describe, identify or define concepts and techniques for controlling cost, schedule, technical content and configuration, and their application project wide. **And to** ***Perform*** critical project control tasks such as reviewing earned value management reports, approving cost and schedule changes, and leading a CCB. ***Apply*** reserve and margin policy and involved in resulting decisions. ***Direct:*** • And/or ***author*** Project Control planning. • The corrective actions for project areas that deviate from baseline. ***Demonstrate*** Leadership in • Applying tracking and trend data to analyze programmatic and technical performance. • Developing, evaluating, and implementing mitigation efforts to address performance variances. • Responsibility for PMC/other reporting when project plan cannot be met. ***Manage*** configurations with relatively concentrated developmental activity (e.g., small number of persons at one site).	**Able to** describe, identify or define concepts and techniques for controlling cost, schedule, technical content and configuration and their application program wide. **And to** ***Perform*** critical project control tasks such as reviewing earned value management reports, approving program costs and schedule changes. ***Direct:*** • The corrective actions for program areas that deviate from project. • The application of tracking and trend data to analyze programmatic and technical performance. • Development, evaluation, and implementation of mitigation efforts to address performance variances. ***Tailor*** reserve and margin policy and ***manage*** its application. ***Be responsible*** for PMC reporting when project plan cannot be met. ***Ensure*** that adequate controls are implemented, such as program control techniques, including EVM, data management, and configuration management. ***Chair*** contract change control board for project. ***Establish*** and ***manage*** configurations for complex products (e.g., many diverse uses and users, complicated documentation and data control requirements, complex user training requirements with more sophisticated training tools).
HQ courses				
Center courses				
OJL activities				

5.2 Project Control Addendum

Role	Project Team Member Subsystem or Small Project Manager	Major System or Large Project Manager Program or Very Large Project Manager
Proficiency Level Description Schedule Management	**Fundamental Skill (Level 1 & 2)** Establishes scheduling, phasing, and execution for projects with limited interrelated paths, few organizational units or contractors, and non-critical deadlines. Possesses adequate awareness of schedule analysis tools and techniques. Able to establish baseline project schedule and schedule management process. Able to analyze and evaluate impacts to baseline schedule and make necessary adjustments. Ensures that long lead items (e.g. export control licenses) are properly addressed.	**Advanced Skills(Level 3 & 4)** Establishes scheduling, phasing, and execution for complex projects with many interrelated paths, involving multiple organizational units or contractors, and especially challenging deadlines. Able to perform resource leveling to meet overall project schedule.
Proficiency Level Description Schedule Management	**Fundamental Skill (Level 1 & 2)** Demonstrates knowledge of documentation and data management requirements levied on the project by Federal, NASA, and JSC rules and regulations. Identifies and implements document and data management strategies for relatively straightforward to moderately complex projects. Audits data and documentation processes periodically over the project life cycle and responds to issues appropriately for relatively straightforward to moderately complex projects.	**Advanced Skills(Level 3 & 4)** Identifies and implements document and data management strategies for large-scale, complex projects. Audits data and documentation processes periodically over the project life cycle and responds to issues appropriately on large-scale, complex projects. Manages documentation and data control requirements for projects with important security and intellectual property issues.

5.3 Project Review and Evaluation: *Planning, conducting and managing internal and external project programmatic and technical reviews that include using metrics to monitor and track the status of the project.*				
Role	**Project Team Member**	**Subsystem or Small Project Manager**	**Major System or Large Project Manager**	**Program or Very Large Project Manager**
Proficiency Level Description	**Able to** describe, identify or define: • Purpose and value of internal and external project reviews. • The review and approval process of technical and programmatic activity. • Tools to objectively measure how much work has been accomplished on a program/ project, and to relate resource planning to technical, cost, and schedule requirements. • Techniques for presenting technical and programmatic information. **And to** ***Use*** EVM and/or other tools to measure, evaluate, and provide input to progress reviews on specific aspects of the project. ***Participate*** in internal project peer reviews as both a presenter and reviewer. ***Work*** with the convening authority to ensure technical reviews occur at the proper project level of maturity.	**Participant** in review and approval process for a technical and programmatic activity. **Able to** describe, identify or define how to plan and conduct subsystem portions of both internal and external project reviews. **And to** ***Prepare*** programmatic and technical subsystem development performance for project management's use in external reviews. ***Present*** subsystem development performance at major milestone reviews such as PDR and CDR. ***Plan*** and ***manage*** internal peer reviews for subsystems ***Manage*** the process of addressing the findings of review panels/boards.	**Significant participation** or **leadership** of an element of the review and approval process for a technical and programmatic activity. **Able to** describe, identify or define all facets of preparing and conducting internal and external reviews. **And to** ***Approve*** and ***manage*** the continuum of internal and external project reviews. ***Document*** and ***present*** project progress in terms of resources, technical, and schedule accomplishments to the Program Office, APMC and at reviews such a PDR, CDR, NAR. ***Recognize*** the need for and ***initiate*** additional reviews (e.g., peer reviews).	**Management** of a project/program through a review and approval process. **Able to** describe, identify or define how to structure and formulate reviews to the major stakeholders at the highest level of Agency management, academia, and industry. **And to** ***Conduct*** major project reviews for the stakeholders of the Governing Program Management Council (GPMC), and Non Advocate, Independent Assessment, or other high level review teams including those from academia and industry.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

6.1. Agency Structure and Internal Goals: *Successfully adapting work approach and style to NASA's functional, social, cultural, and political structure and interrelationships to achieve Agency, Mission, Directorate, Center, program and project goals.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • NASA structure (Agency, Directorate, Center, and Organization). • NASA goals at all levels (Agency, Mission Directorate, Center, Program, Project). • Agency/Center vision, mission, plans and objectives. • Center's roles and relationships. **Able to**: • Work within a branch, division, or other well-defined organizational hierarchy to achieve project goals. • Work well with organizational units having largely compatible interests. • Develop key contacts within the center. **And to** ***Demonstrate*** knowledge of major Center/NASA organizational units, their function, and their interrelationships. Obtains authorization and funding for projects of interest within a branch or division.	**Able to** describe, identify or define the flow down of Agency, mission directorate, program, and project strategic goals and how they are addressed at the subsystem level. **And to** ***Participate*** in inter-Center or multi-Agency activity. ***Contribute*** to activities addressing alignment and metrics of assigned functions with Agency vision, mission, plans, and objectives. ***Demonstrate:*** • How the subsystem requirements and goals support the project goals. • Sophisticated knowledge of Center /NASA organizational units, including their function, their interrelationships, their unique cultures, the power brokers in each, etc. ***Work*** effectively across divisions, programs, Centers and NASA as a whole to achieve project goals. ***Obtain*** authorization and funding for projects of interest within a branch or division. ***Successfully adapts work approach and style*** to the unique cultures of organizational units and nationalities.	**Able to** describe, identify or define the flow down of Agency, mission directorate, program, and project strategic goals and how they are addressed at the subsystem level. **And to** ***Demonstrate*** how the subsystem requirements and goals support the project goals. ***Significantly participate in*** or ***lead*** inter-Center activity or multi-Agency activity. ***Develop*** and ***demonstrate*** network of key contacts within the Center and Agency. ***Participate*** in actively addressing alignment and metrics of assigned functions with Agency vision, mission, plans, and objectives. ***Work*** effectively with organizational units with competing interests and significant cultural differences to achieve mutually beneficial collaboration. ***Be adept*** at identifying and surmounting organizational and bureaucratic obstacles to achievement of project goals.	**Able to** describe, identify or define: • NASA's organizational structure, political landscape and other Agency relationships. • How NASA's functional, social, cultural, and political structure policies are integrated into program and project management decision-making and operations. **And to** ***Approve*** the program plan and ***manage*** it such that contributions to the Agency goals are met. ***Lead*** inter-Center activity. ***Demonstrate*** sophisticated knowledge of Center /NASA organizational units, including their function, their interrelationships, their unique cultures, the power brokers in each, etc. **Successfully pulls together** authorization and funding for projects involving different organizational units, including even broad mixes of directorates, programs, Centers, etc.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

6.2 NASA PM Procedure & Guidelines: *Using NASA program management and other relevant policies and guidelines for formulating, approving, implementing, and evaluating NASA programs and projects.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define NASA and Center project management policies and guidelines for formulating, authorizing, implementing, and evaluating programs and projects outlined in NASA Procedures and guidelines--- NPR 7120.5C, ISE 9000+ SP 6105 Flight Project Practices Design Principles **And to** ***Demonstrate*** implementation of NASA and Center project management guidelines to managing a project element.	**Able to** describe, identify or define how NASA and Center program and project management policy directives and guidelines are applied to sub-system activities. **And to** ***Demonstrate*** implementation of NASA program and project management policy directives and guidelines to formulating, implementing, and evaluating a sub-system or system (e.g., application of NPR 7120.5C, ISE 9000+, and SP 6105).	**Experienced** in structuring activity to conform to NPR 7120.5C, SE 9000+, and SP 6105. **Able to** describe, identify or define: • Processes for verifying compliance with and assuring implementation of appropriate NASA and Center program and project management policy directives. • Role of the Systems Management Office in assisting projects with guideline interpretation and implementation. **And to** ***Demonstrate*** compliance with program and project management policy directives and guidelines in formulating, implementing, and evaluating projects. ***Coordinate*** with the Systems Management Office to ensure that the project stays within NASA procedural parameters. ***Demonstrate*** ability to interact with NASA and Science Community.	**Experienced** in establishing policy directives and criteria for conformation to NPR 7120.5C, SE 9000+, and SP 6105. **Able to** describe, identify or define the requirements for formulating, implementing, and evaluating programs within the disciplined approach of NASA Procedures and Guidelines NPR 7120.5C.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

6.3 International Standards: *Analyzing international standards of project management for political implications and incorporation into project activity to enhance performance and to adhere to legal guidelines at all levels of the project or program.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • The NASA policy and guideline documents for international agreements and standards of project management. • International Traffic and Arms Regulations (ITAR) constraints. **And to** ***Understand*** and ***follow rules*** for handling export-controlled items. ***Demonstrate*** compliance with international agreement and standards of project management at the work element level as appropriate.	**Able to** describe, identify or define: • The NASA policy and guideline documents for international agreements and standards of project management, and how to incorporate them into subsystem activities. • Appropriate domestic and international partnerships and ITAR constraints. **And to** ***Demonstrate*** compliance with international agreements and standards of project management at the subsystem level. ***Apply*** international standards of project management including ITAR constraints. ***Establish*** required International Agreements. ***Put in place*** access control plans for foreign nationals working on or with project. ***Apply*** for required licenses and exception/exemptions in a timely manner. ***Ensure that***: • All members of team understand and follow rules for handling export-controlled materials and working with foreign national employees and partners. • Hardware, software and data exports and licensing milestones are identified in project plans and schedules. • Appropriate export clauses are included in any required contracts.	**Able to** describe, identify or define: • Use of NASA international agreement and standards policies of project management for incorporation at all levels of the project. • Export control regulations as applied to complex, large projects involving both exports and defense services with multiple parties. • Business and International Relations. **And to** ***Demonstrate*** compliance with international agreements and standards of project management. ***Analyze*** international standards of project management and incorporate them into project activity to enhance performance. ***Apply*** international partnerships and ITAR constraints. ***Participate*** in domestic and international partnerships in compliance with ITAR.	**Able to** describe, identify or define the political and legal implications of the program and project within the guidelines of international standards for program and project management at all levels. **And to** ***Demonstrate*** program compliance with NASA international agreement policies. ***Adhere*** to legal international guidelines at all levels of the project and the political implications of the program or project. ***Manage*** the application of international partnerships and ITAR constraints.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

7.1. Position Management: *Using position descriptions, Resume Builder, and the NASA Stars database to identify and document project roles and responsibilities and to manage the performance evaluation process.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Be aware of**: • Own capabilities. • Each member's capabilities and function. **Understand:** • Position Description (PD). • Résumé Builder. • NASA STARS résumé tool and database. • The roles, responsibilities, and functions of each team member. • The Performance Evaluation process and its importance to effective Human Capital/ Resources Management.	**Able to:** ***Supervise*** a subsystem or small team considering the roles, responsibilities, and functions of each team member. ***Perform*** team Performance Evaluations to identify key strengths and opportunities for development.	**Able to:** ***Supervise*** a project team considering the roles, responsibilities, and functions of each team member. ***Perform*** team Performance Evaluations to identify key strengths and opportunities for development.	**Able to:** ***Define*** the roles, responsibilities, and functions of organizations and their leaders. ***Perform*** Performance Evaluations of organizations and their leaders to identify key strengths and opportunities for development.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

7.2. Recruitment, Hiring and Retention: *Performing human resource management activities (i.e., recruitment, selection, performance evaluation, etc.) to ensure projects are appropriately staffed with qualified team members throughout the project life cycle.*				
Role	**Project Team Member**	**Subsystem or Small Project Manager**	**Major System or Large Project Manager**	**Program or Very Large Project Manager**
Proficiency Level Description	**Understand:** • NASA's processes for recruiting, evaluating, selecting and staffing teams. • Techniques for motivating and rewarding professional performance.	**Able to:** • Recruit, evaluate, select and staff teams. • Identify and select team members or delineate desired personal characteristics (e.g., traits, skills, abilities) of team members necessary to staff small to moderate size projects consisting primarily of team members from own organization. • Identify and obtain the required personnel resources for successful project formulation and implementation. • Participate in achieving desired performance through other personnel. • Ensure that short-term projects are appropriately staffed throughout project life cycle. • Provide leadership role.	**Able to** identify and select team members or delineate desired personal characteristics (e.g., traits, skills, abilities) of team members necessary to staff small to moderate size projects consisting primarily of team members from own organization.**And to**: ***Be involved*** in staffing strategies and in recruiting, evaluating, selecting, supervising, and staffing teams. ***Demonstrate:*** • Capability in identifying and obtaining the required personnel resources for successful project formulation, implementation, or operations. • Achievement of desired performance through other personnel.	**Able to** identify and select team members or delineate desired personal characteristics (e.g., traits, skills, abilities) of team members necessary to staff multiple projects supported by multiple Centers and/or multiple contracts. **And to** ***Establish*** staffing strategies for recruiting, evaluating, selecting and staffing projects. ***Lead*** establishment of staffing strategies for recruiting, evaluating, selecting and staffing projects. ***Demonstrate*** achievement of desired performance through other personnel. ***Ensure*** long-term, extremely complex projects are appropriately staffed throughout their life cycle.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

7.3. Team Dynamics and Management: *Demonstrating genuine intentions to work cooperatively with diverse project team members; designing, facilitating, and managing team processes; and developing and implementing strategies to promote team morale and productivity.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • Techniques for motivating and rewarding professional performance. • Principles of group dynamics. • The importance of team activities, group problem solving, brainstorming and conflict resolution within or among teams. • Characteristics of a superior NASA project team (as outlined in APPL's research study). • Her/His primary role and responsibilities on the project team. • Her/His relationships and interfaces with other project team members, customers, stakeholders and partners. • Awareness of advocacy and inquiry (openness to changing own viewpoint) to achieve team success. **And to** ***Effectively manage*** her/his interfaces and relationships with other project team members, customers, stakeholders and partners. **Serve** as a constructive and creative participant in team processes such as brainstorming, problem solving and conflict resolution. ***Establish*** and use an external network of technical expert colleagues to enhance project success. ***Manage*** small teams. ***Adjust*** leadership style to meet the demands and requirements of different situations and groups.	**Able to** describe, identify or define: • The importance of participating in team activities to enhance system/subsystem and project success. • Effective group processes and techniques for: o Problem Solving o Communication o Conflict Resolution o Brainstorming • Constructive versus destructive team behaviors. • How to design and facilitate an effective team meeting. **Able to:** • Communicate and clarify project's mission, strategies and requirements throughout the project. • Communicate and clarify the roles and responsibilities of team members, and what their expected or required behaviors are. • Design and facilitate effective team meetings with project team members. • Build teams of individuals with complementary talents, experiences and skills. • Lead and facilitate conflict resolution, negotiation, and problem solving techniques within the project team. • Lead a small team. • Outline a clear direction for team members and motivate team members to pull together to accomplish goals. • Be an advocate. • Apply advocacy/ inquiry (openness to changing own viewpoint) within team.	**Able to** describe, identify or define: • Successful techniques for fostering and facilitating communication, collaboration and integration among subsystem/element leads. • Key characteristics of a superior NASA project team, and the project manager's role and responsibility in developing this. • Effective versus ineffective forms of communication and constructive versus destructive forms of performance feedback. • When, where and how to apply the appropriate form of decision making such as by command/ direction, consultation or consensus. **Able to:** • Lead a major team, such as a subsystem or small project. • Communicate clear roles, responsibilities, expectations enthusiasm and commitment to achieving goals. • Identify and lead effective team processes for setting team goals, team building, meeting facilitation, problem solving, brainstorming and conflict resolution for multi-functional teams. • Adapt leadership style to deal effectively with, and gain support from diverse types of people and at all phases of the project life cycle, even in difficult or stressful situations. • Protect team when outside influences hinder project progress.	**Able to** describe, identify or define: • Relationship between superior project teams and a program's success. • The program manager's role and responsibility in team dynamics. • Symptoms of a dysfunctional or "at risk of failure" project team and successful techniques and resources for intervening with or helping this team. **And to** ***Accomplish*** the application of advocacy inquiry (open-ness to changing own viewpoint) within team. ***Establish*** the direction and focus of the program, and communicates this to all members of the team. ***Apply*** the theory and practice of team dynamics to successfully execute a program and the related projects. ***Design*** and ***facilitate*** effective collaboration, communication, planning and decision-making processes throughout the program. ***Create*** exceptionally strong morale and spirit with very diverse teams, across organizations and programs. ***Build*** high-powered teams across organizations and programs without creating barriers or counterproductive competitiveness.
HQ courses				
Center courses				
OJL activities				

8.1. Environment and Ecology: *Analyzing and evaluating projects' ecological implications to ensure compliance with environmental regulations and the safety of product, users, the workforce, and the public. Developing environmental impact statement and hazards analysis.*				
Role	**Project Team Member**	**Subsystem or Small Project Manager**	**Major System or Large Project Manager**	**Program or Very Large Project Manager**
Proficiency Level Description	**Understand** the ecological implications a participant's program/project has on the environment. **Be aware** of environmental impact statements or actions to comply with environmental regulations. **Contribute** to hazards analyses and specific actions for mitigation to ensure safety of product, users, workforce, and public.	**Apply** one's understanding of the project's ecological implications to shape a subsystem's activity to ensure safe outcomes. **Knowledge of** environmental impact statements or actions to comply with environmental regulations. **Experience with** hazards analysis and specific actions for mitigation to ensure safety of product, users, workforce, and public.	**Experience with** developing environmental impact statements or actions to comply with environmental regulations. **Develop** hazards analysis and specific actions for mitigation to ensure safety of product, users, workforce, and public.	**Lead** development of environmental impact statements or actions to comply with environmental regulations. **Develop** hazards analysis and specific actions for mitigation to ensure safety of product, users, workforce and public.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

8.2. Workplace Safety: *Ensuring that workplace safety is an integral part of developing products by applying systems safety analysis techniques throughout the project life cycle and integrating critical hazard elimination/mitigation measures into risk management and safety plans.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • The factors that affect safety to the public, astronauts, work force, and capital, and safety in the workplace while developing products. • Flight safety review process and preparation, review, or approval or project safety and quality management plans. • The application of systems safety analysis techniques throughout the project lifecycle. • Certificate of Flight Readiness (CoFR) process. • Processes to assign hazard levels and implement mitigation plans. **And to** ***Perform*** hazard analyses on assigned system/subsystem to identify and mitigate hazards. ***Report*** analysis findings and recommendations for inclusion in risk management plan. ***Be involved*** in a mishap investigation or failure review board. ***Utilizes*** standard safety reporting methodology. ***Select*** existing NASA safety plans for project situations with ample precedent.	**Experience**: • In a mishap investigation or failure review board. • With flight safety review process and preparation, review, or approval of project safety and quality management plans. **Able to** describe, identify or define: • The application of systems safety analysis techniques throughout the project lifecycle. • Processes to assign hazard levels and implement mitigation plans. **And to** ***Employ*** the factors that affect safety to the public, astronauts, work force, and capital, and safety in the workplace while developing products. ***Perform*** hazard analyses on assigned system/subsystem to identify and mitigate hazards ***Report*** analysis findings and recommendations for inclusion in risk management plan ***Participate*** in CoFR process. ***Establish*** safety plans for more routine systems in relatively low-risk environments.	**Possesses:** • Significant experience on a mishap investigation or failure review board. • Leadership role in flight safety review process and preparation, review, or approval of project safely and quality management plans. **Able to** describe, identify or define: • The requirements for project lifecycle systems safety. • Processes for evaluating the adequacy of system safety analysis reports and mitigation plans. **And to** ***Review*** and ***integrate*** system safety analyses and hazard elimination/mitigation recommendations into project risk management plan. ***Approve*** hazard elimination/mitigation measures. ***Coordinate*** inputs for CoFR. ***Formulate*** innovative safety plans for project situations for which precedents and established plans do not exist. ***Identify*** innovative safety reporting methodology.	**Able to** describe, identify or define the requirements and procedures for implementing system safety findings into program and project planning. **And to** ***Review*** and ***approve*** program system safety plans. ***Approve*** most critical hazard elimination/mitigation measures. ***Lead*** a mishap investigation or failure review board. ***Play*** leadership role in flight safely review process and preparation, review, or approval or project safely and quality management plans. ***Ensure*** project met CoFR requirements. ***Develop*** safety plans for complex systems in challenging environments and severe consequences of failure. .
HQ courses				
Center courses				
OJL activities				
Other learning activities				

8.3. Mission Assurance: *Implementing safety, reliability, maintainability, and quality assurance activities throughout the project life cycle in accordance with NASA's safety and mission assurance (SMA) strategies, policies, and standards.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Understand** and **comply with** NASA safety and mission assurance strategies, policies, and standards. **Able to** describe, identify or define: • NASA safety and mission assurance strategies, policies, and standards. • Basic Principles of SMA. • Specialty engineering (e.g. safety, reliability, maintainability and quality engineering) processes and how they are integrated into the system of interest. • IT security issues, policy, and procedures. • Project activities to support safety and mission assurance including project quality and safety management and the Certificate of Flight Readiness (CoFR) process. **Able to** coherently integrate specialty engineering activities to ensure safety and mission success. **And to** *Demonstrate* safety, reliability, maintainability, and quality assurance practices through own work or in conjunction with a safety and mission assurance (SMA) organization.	**Experience** with project activities to sup-port safety and mission assurance such as involvement with flight safety reviews and quality or safety plans. **Able to** describe, identify or define: • Processes for evaluating appropriate SMA activities for subsystems. • How to understand SMA assessment results and implement corrective actions. **And to** . ***Participate*** in SMA activity planning for the subsystem. ***Apply*** safety principles to system. ***Perform*** safety and mission assurance (SMA) assessments and process verification reviews; and, provide analysis and recommendations for critical project or subsystem safety decisions. ***Review*** SMA assessments results and take corrective actions where necessary. ***Demonstrate*** knowledge of IT security issues, policy and procedures. ***Contribute*** to the CoFR process.	**Able to** describe, identify or define: • The range of SMA activities available to a project and the process for evaluating which will be the most appropriate and effective. • How to understand SMA assessment results and allocate resources to implement corrective actions. **And to** ***Review*** and ***approve*** SMA plans for the project. ***Review*** and ***approve*** corrective actions to problems found through SMA activities ***Develop*** a Mission Assurance / Safety plan ***Demonstrate*** significant knowledge of IT security issues, policy and procedures. ***Play*** a leadership role sup-porting safety and mission assurance through activities such as flight safety reviews, approval, or management of quality or safety plans. ***Support*** a project through the CoFR process.	**Able to** describe, identify or define the range of SMA activities available to a program and the process for allocating required resources to achieve high levels of mission assurance. **And to** ***Review*** and ***approve*** SMA plans for the program. ***Manage:*** • IT security policy and procedure efforts. • A project to ensure safety and mission assurance procedures were employed, including flight safety reviews, quality plans, and safety plans. • A project through the CoFR process. .
HQ courses				
Center courses				
OJL activities				
Other learning activities				

8.4 Security:				
Role	**Project Team Member**	**Subsystem or Small Project Manager**	**Major System or Large Project Manager**	**Program or Very Large Project Manager**
Proficiency Level Description				
HQ courses				
Center courses				
OJL activities				
Other learning activities				

9.1. Mentoring and Coaching: *Acting as an advisor, sponsor, or confidant who shares knowledge about NASA's functional, social, cultural, and political aspects or provides counseling to cultivate skills in order to enhance individual, team and organizational performance and growth.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • The importance of coaching and mentoring. • The role of a mentor and/or coach, as well as the role of the mentee/coachee in this process. • The availability of mentoring/coaching opportunities. • Characteristics of a successful mentoring program. • The importance of coaching and mentoring. **And to** ***Meet*** regularly with mentor/coach to discuss individual development plans. ***Serve*** as an informal mentor to project teams in areas of technical expertise.	**Able to** describe, identify or define: • Key distinctions between coaching and mentoring activities. • Distinction in roles and responsibilities between a coach/mentor and an individual's supervisor. • Successful coaching techniques and practices that foster and sustain effective team performance. **And to** ***Coach*** and ***mentor*** subordinates or persons from other groups. ***Serve*** as a mentor to at least one team member throughout the subsystem project and meets with them on a regular basis. ***Apply*** coaching skills to improve, sustain and/or enhance project performance of team members throughout the subsystem.	**Able to** describe, identify or define: • Relationship between effective mentoring and the success of the project. • Effective coaching skills for improving/enhancing performance by individuals and teams. • Roles and responsibilities of the project manager as mentor and/or coach. **And to** ***Serve*** as a mentor to at least one subsystem/ element lead. ***Solicit*** and ***secure*** her/his own mentor, and ***meet*** with them on a regular basis. ***Provide*** opportunities for development of support personnel. ***Receive*** periodic personal coaching from an administrative coach or mentor to improve identified weaknesses.	**Able to** describe, identify or define: • Relationship between effective mentoring/ coaching behaviors and the program's success. • The use of mentoring and coaching in a program's projects to enhance performance and project manager development. • The role of the program manager as a mentor. **And to** ***Serve*** as a mentor to at least one project manager. ***Advocate*** for and supports mentoring resources for project managers. ***Create*** a culture of development for support personnel. ***Establish*** a coaching and mentoring climate and program for organization. ***Receive*** periodic personal coaching from an administrative coach or mentor to improve identified weaknesses.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

9.2. Communication/Decision Making: *Implementing strategies for clear and constructive communication both internally within the project team and externally to stakeholders, technical experts, contractors and others. Also involves communicating decisions in a timely manner.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • Effective versus ineffective interpersonal and programmatic communication practices within a project team. • Effective versus ineffective methods for presenting technical and/or project information. • Available communication and collaboration technologies and tools. • Developing skills in speaking, writing, and dialogue in formal and informal communications. **And to** ***Communicate:*** • Results and decisions within the project team in a timely manner. • With audiences that are familiar with topic presented and that are supportive of self and work team in oral and written form). • In face-to-face or small group settings. Effectively ***use*** communication and collaboration technologies and tools. ***Create*** and ***present*** complete and concise technical and programmatic project reports that are targeted for the appropriate audience.	**Able to** describe, identify or define: • Communication approaches that establish an open and positive environment. • Web-based communication technology and tools capable of enhancing communication and collaboration within and between project team members and project teams. • Key steps in designing and facilitating an effective team meeting **And to** ***Demonstrate*** skills in speaking, writing and dialogue in formal and informal communications. ***Communicate effectively*** (in oral and written form): • Even with audiences who are unfamiliar with the topic presented and is persuasive in adversarial and emotional situations. • To large groups, diverse groups, and using electronic media (e.g., teleconferences). ***Make*** presentations of status, challenges and/or problem solutions. ***Design***, ***schedule*** and ***facilitate*** effective team meetings to reduce errors and/or redundancies. ***Perform*** constructive, interpersonal communication practices such as giving and receiving constructive feedback, respecting the views of others, and active listening. ***Present*** (in oral and written form) even complex material at a level that facilitates understanding and which is carefully tailored to the audience. ***Create*** and ***use*** appropriate web-based communication technology and tools for efficient communication within and between project teams.	**Able to** describe, identify or define: • Effective practices for designing and implementing a communication plan. • How to develop effective communication practices within and across project boundaries. • Effective versus ineffective project presentations, such as those given at reviews. ***Demonstrate*** the implementation of a communication plan that includes effective oral and written communications within the project team and across project boundaries. ***Make presentations*** to senior management, at professional meetings or at public media events in support of NASA. ***Conduct*** public media interviews concerning status, challenges, and accomplishments. ***Create*** and ***present*** complete and concise technical and programmatic project reports that are appropriately targeted for a wide array of audiences.	**Able to** describe, identify or define: • How to facilitate effective communications throughout a program and its projects. • The importance of clear and constructive communication. ***Communicate*** and ***advocate*** to high levels of Government and pubic media regarding issues of importance to NASA and the public. ***Create*** and ***present*** complete and concise technical and programmatic project reports to Center and Headquarters Management and other stakeholders. ***Communicate*** and ***update*** the project managers on any necessary information and changes as they arise.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

9.3. Leadership: *Influencing, inspiring, and motivating individuals and teams to accomplish goals; creating conditions for individuals and teams to be effective; and recognizing and rewarding individual and team achievements.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Understand** leadership techniques by focusing on strategies for personal and team professional growth and understanding the power of influence, motivation, vision, and resolve, as well as the relationship between leading and managing. **Able to** describe, identify or define: • Successful practices for motivating, influencing and inspiring others. • Characteristics of a good leader. • How to design and facilitate small team meetings. • The need for leadership improvement and personal development activities. **And to** ***Design*** and ***facilitate*** small meetings effectively. ***Provide*** technical leadership to the team in area of expertise. Effectively ***assume*** and ***provide*** situational leadership to teammates resulting in the successful resolution of a particular problem or challenge *outside* of one's area of technical expertise.	**Able to** describe, identify or define: • Effective techniques for facilitating the transition from being an individual contributor to serving in a leadership role. • Effective techniques for managing/leading a small, multi-disciplinary team of technical experts. • Best practices in: o Conflict resolution. o Motivating, recognizing and rewarding individual and team achievements. o Assigning and delegating tasks to project team members. • Examples of leadership improvement and personal development activities. • Examples of active involvement in maintaining and increasing professional knowledge and capabilities. **And to** ***Lead*** a team, such as an Integrated product Team, for a subsystem by employing leadership techniques. Effectively ***identify***, ***clarify*** and ***communicate*** team members' roles and responsibilities. ***Implement*** best practices in: conflict resolution; Motivating, recognizing and rewarding individual and team achievements; Assigning and delegating tasks to project team members. ***Establish*** a work environment and team culture where problems, risks and conflicts can be surfaced and addressed without fear of reprisal. ***Communicate*** technical direction and goals for the team.	**Able to** describe, identify or define: • Unique, effective practices for leading and managing subsystem/element leaders. • Best practices in: o Team-based leadership (per APPL's Superior Teams Research). o Identifying and selecting subsystem/element leads with the skills-mix required to accomplish project requirements. o Motivating, recognizing and rewarding accomplishments throughout the project. o Defining success criteria and tracking performance for work/tasks throughout the project. **And to** ***Participate*** in ongoing assessments of her/his leadership capabilities, and develops strengths/corrects weaknesses based on these assessments. Effectively ***motivate, recognize and reward*** accomplishments throughout the project. ***Assign, delegate, and reassess*** tasks/ work effectively throughout the project. ***Define track and manage*** success criteria for performance throughout the project. ***Participate*** actively in leadership assessments by team members throughout the project life cycle. ***Lead*** a major team, such as an Integrated Product Team or other multidisciplinary teams, toward achievement of goals.	**Able to** describe, identify or define: • Effective methods for leading and managing project managers. • Motivating, recognizing and rewarding performance throughout the program. **And to** ***Ensure*** that project managers are aware of the goals of the program and ***guide*** them in how to adapt to changes as they occur. ***Be proactive*** in leadership improvement and personal development activities. ***Lead*** multiple activities and develop the organization and team leaders to better perform and operate.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

9.4. Ethics: *Demonstrating integrity, ethical conduct, and acceptable behavior in all project activities in line with federal government principles.*				
Role	**Project Team Member**	**Subsystem or Small Project Manager**	**Major System or Large Project Manager**	**Program or Very Large Project Manager**
Proficiency Level Description	**Understand** ethical conduct and service principles in the federal government. ***Demonstrate*** ethical practices • Always tell the truth, whether delivering good news or bad. • Show consistency among principles, practices, and behaviors; honors commitments and promises – actions match words. • Behave in a fair and ethical manner; create a culture that fosters high standards of ethics; take immediate action if he or she observes unethical behavior. • Accepts responsibility for actions and admits mistakes.	**Follow** federal government ethical conduct and service principles in all project activities.	**Demonstrate** integrity and ethical performance of all project activity.	**Create** a culture of integrity and ethical performance for all project activity.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

10.1 Knowledge Capture and Transfer: *capturing and transferring knowledge in an organized fashion to improve performance and reduce risk associated with future programs and projects.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • The value of capturing and managing knowledge and of the NASA knowledge management vehicles. • The general definition of "Knowledge Management." • The purpose and key features of NASA Lessons-Learned database and its use. • Agency and Center knowledge management activities and resources, such as KM tools and technologies. • Program/project knowledge management processes and requirements. • The value of knowledge capture from all phases of a current project, as well as application of lessons learned/ best practices from previous programs and projects and significant studies, such as the Columbia Accident Investigation Board (CAIB) and Diaz Reports. **And to** ***Use*** NASA's Lessons Learned Information System (LLIS) and other Agency and Center KM resources to enhance project performance. ***Contribute*** to project team's lessons-learned activities.	**Able to** describe, identify or define: • Effective processes for using LLIS and other KM resources to enhance subsystem/ element/project performance. • Processes for capturing and documenting project team's experiences, practices, successes, and failures throughout the life cycle of the project and subsystem activity. **And to** ***Document*** and ***share*** lessons learned and best practices with other subsystems or projects through current NASA vehicles. ***Create*** and ***maintain*** real-time "lessons being learned" documentation. ***Contribute*** to Center's lessons-learned activities and to NASA's Lessons Learned Information System. ***Contribute*** to the documentation of current project history and lessons learned. ***Model*** and ***promote*** use (application) of Lessons-Learned Information System to enhance project performance. ***Evaluate*** lessons learned/best practices from previous programs and projects and significant studies, such as the CAIB and Diaz Reports.	**Able to** describe, identify or define the requirements, processes, and benefits involved in establishing a project system to capture, document and track project data for lessons learned use. **And to** ***Capture, document, and track*** valuable project practices, making them readily available to other project practitioners through current NASA vehicles. ***Ensure*** that real-time 'lessons-being-learned' are being captured. ***Integrate*** the documentation of current project history and lessons learned. ***Demonstrate*** capabilities in the use of pertinent lessons learned/best practices from previous programs/ projects and experience, and relevant studies such as the CAIB and Diaz Reports.	**Able to** describe, identify or define application and integration of NASA's Lessons Learned Information System (LLIS) and other Agency and Center KM resources to enhance project performance. **And to** ***Lead*** team and other project practitioners in capturing, documenting, and tracking valuable project practices, making them readily available to other project practitioners through current NASA vehicles. ***Promote*** and ***require*** the effective application of Lessons-Learned processes and resources (including LLIS) across program projects. ***Manage*** the documentation of current project history and lessons learned. ***Provide*** leadership in creating a lessons learned/best practices culture, drawing from previous programs/ projects and significant studies, such as the CAIB and Diaz Reports. ***Promote*** and ***require*** the effective application of Lessons-Learned processes and resources (including LLIS) across program projects.
HQ courses				
Center courses				
OJL activities				
Other learning activities				

10.2 Knowledge Sharing: *sharing organizational practices and approaches related to generating, capturing, disseminating know-how and other content relevant to NASA's business and processes.*

Role	Project Team Member	Subsystem or Small Project Manager	Major System or Large Project Manager	Program or Very Large Project Manager
Proficiency Level Description	**Able to** describe, identify or define: • Distinctions between: o Knowledge sharing and knowledge management o Tacit and explicit knowledge • Agency and Center practices and resources for capturing and sharing tacit knowledge. • The value and application of lessons learned/best practices. • The importance of sharing knowledge through story telling and the *Reflective Practitioner* concept. • NASA KS forums and workshops. **And to** ***Use*** ILDP's online Knowledge Sharing resources (e.g. *ASK Magazine*). ***Participate*** in, and contribute to, the Center's project knowledge sharing forums and activities (papers, conferences, etc.) associated with one's technical expertise. ***Share*** technical expertise and project experience with team members.	**Able to** describe, identify or define: • How to design and facilitate a team-based knowledge sharing forum/activity. • Agency and Center resources available to support knowledge sharing activity. **And to** ***Demonstrate*** knowledge of pertinent lessons learned/best practices. ***Participate*** in knowledge sharing activities. ***Design*** and ***facilitate,*** at minimum, two knowledge sharing forums for the project team members. ***Present*** Lessons Learned experiences at Center-based knowledge sharing forums.	**Able to** describe, identify or define: • How, when and where to create and apply knowledge sharing activities to enhance project performance. • Procedures for contributing and sharing project's tacit knowledge with other Center and Agency projects. **And to** ***Provide*** examples of knowledge of, use and contributions of pertinent lessons learned/best practices. ***Encourage*** the team to apply knowledge sharing principles to foster a learning environment. ***Contribute*** to NASA's KS activity. For example: • Design and present at knowledge sharing forum for subsystem/element lead team members throughout the project. • Attend a Master's Forum.	**Able to** describe, identify or define Agency knowledge sharing requirements, resources and activities. **And to** ***Provide*** leadership in creating culture of knowledge capture and application of lessons learned/best practices.
HQ courses				
Center courses				
OJL activities				
Other learning activities				